

### **Remarks**

Claims 1-38 were originally filed. Claims 1, 4, 8, and 38 were previously amended, and Claims 7, 17-22, and 36 were previously canceled.

### **Rejection Under 35 U.S.C. Section 112**

Claims 1 and 38 were rejected under the first paragraph of Section 112 as failing to comply with the written description requirement. This rejection is respectfully traversed for the following reasons.

The Examiner has asserted that Claims 1 and 38 contain subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. According to the Examiner, the statement in Paragraph [0046] of Applicants' specification (that "[h]ybrid organic/inorganic reactive species can be used in the photoreactive compositions with or without the addition of inorganic particles") is not the same as reciting that the hybrid organic/inorganic reactive species is used in said substantially inorganic photoreactive composition without the addition of inorganic particles. Applicants respectfully submit that a careful reading of Applicants' specification clearly shows possession of the invention as currently claimed.

The substantially inorganic photoreactive composition of Applicants' claims is described, for example, in a section (set forth in Paragraphs [0023]-[0173] of Applicants' specification) entitled "Substantially Inorganic Photoreactive Composition." Paragraph [0024] states that "[p]hotoreactive compositions useful in the process of the invention are substantially inorganic in nature, so as to generally be thermally stable under the conditions commonly used in fabricating photonic crystals (for example, temperatures up to about 600 to 1300°C). Upon photoreaction and pyrolysis, such compositions lose less than about 80 percent (preferably, less than about 60 percent; more preferably, less than about 40 percent; most preferably, less than about 30 percent) of their initial weight."

Paragraph [0025] further states that "[s]uitable compositions include compositions comprising (1) at least one reactive species; (2) a photoinitiator system (preferably, a multi-photon photoinitiator system); and (3) optionally, a plurality of inorganic particles. The

compositions can optionally further comprise non-reactive species (for example, non-reactive polymeric binders). When surface roughness is a concern, the compositions preferably do not contain inorganic particles” (emphasis added).

Thus, Paragraph [0025] clearly states that inorganic particles are an optional component of the substantially inorganic photoreactive composition. This leads one of ordinary skill in the art to conclude that, in at least some embodiments, the amount of inorganic content necessary to meet the above-detailed requirements (of limited weight loss upon photoreaction and pyrolysis) can be provided by one or more of the other components of the composition.

The reactive species component of the composition is described in, for example, Paragraphs [0027]-[0047] of Applicants’ specification. Paragraph [0028] states that “[s]uitable reactive species include curable and non-curable species. Curable species are generally preferred and include, for example, those that are organic (for example, acrylates) or hybrid organic/inorganic (for example, organosilanes) in nature.” This leads one of ordinary skill in the art to conclude that the reactive species can be a source of inorganic content in the composition when a hybrid organic/inorganic reactive species is utilized. This conclusion is further supported by the succeeding paragraphs of Applicants’ specification, which describe the organic reactive species and the hybrid organic/inorganic reactive species.

For example, the organic reactive species are described in Paragraphs [0032]-[0044] of Applicants’ specification. Paragraph [0033] states that “[o]rganic reactive species can be utilized in the photoreactive compositions in combination with inorganic particles and/or hybrid organic/inorganic reactive species” (emphasis added). This statement clearly conveys to one of ordinary skill in the art that compositions comprising organic reactive species can become substantially inorganic by including (1) inorganic particles, (2) hybrid organic/inorganic reactive species, or (3) both in the composition.

The hybrid organic/inorganic reactive species are next described by Applicants (in Paragraphs [0045]-[0047] of Applicants’ specification). Paragraph [0046] states that “[h]ybrid organic/inorganic reactive species can be used in the photoreactive compositions with or without the addition of inorganic particles.” This statement, when read by one of ordinary skill in the art after reading the above-cited preceding paragraphs of Applicants’ specification, further emphasizes the role of the hybrid organic/inorganic reactive species in providing substantial inorganic content to the composition. The inorganic particles are again said to be an optional

component. Thus, regardless of whether the reactive species is organic or hybrid organic/inorganic or a combination thereof, the inorganic particles are said to be optional.

For at least the foregoing reasons, Applicants' specification as a whole clearly conveys to one of ordinary skill in the art that Applicants were in possession of the claimed invention. Claims 1 and 38 selectively cover process embodiments in which the photoreactive compositions derive their substantially inorganic character from the presence of hybrid organic/inorganic reactive species. The hybrid organic/inorganic reactive species are used in the compositions without the addition of inorganic particles, which Applicants' specification expressly labels as an optional component of the substantially inorganic composition. Applicants' specification describes such inorganic particle-free process embodiments and thereby provides ample support for these claims. Applicants therefore respectfully request that the rejection under Section 112 be withdrawn.

### **Rejections Under 35 U.S.C. Section 103**

Claims 1-6, 8-16, 23-27, and 37-38 were rejected under Section 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/ 0012872 (Fleming et al., hereinafter referred to as Fleming) in view of U.S. Patent Application Publication No. 2003/0151032 (Ito et al., hereinafter referred to as Ito). This rejection is respectfully traversed for the following reasons.

This rejection was addressed in Applicants' last submitted Amendment, in remarks that are incorporated herein by reference. Applicants' claims specify that a hybrid organic/inorganic reactive species is always present in the substantially inorganic photoreactive composition. The hybrid organic/inorganic reactive species can be present alone or in combination with organic reactive species. The claims further specify that the hybrid organic/inorganic reactive species is selected from silane compounds having at least one polymerizable organic group, hydrolysates of said silane compounds, and combinations thereof, and that the hybrid organic/inorganic reactive species is used in the composition without the addition of inorganic particles.

The Examiner has maintained the rejection under Section 103 in spite of the fact that the combination of Fleming and Ito does not provide Applicants' claimed process. Fleming does not appear to describe Applicants' hybrid organic/inorganic reactive species that is selected from silane compounds having at least one polymerizable organic group, hydrolysates of said silane

compounds, and combinations thereof. Rather, Fleming appears to describe only organic reactive species (note that Applicants' claims specify that epoxy-functional silicones are considered to be organic reactive species).

Although at least some of the compositions of Ito comprise polymerizable, hydrolysable silane compounds as the resin component, such compounds are used in the Ito compositions in combination with inorganic particles. Thus, the combination of Fleming and Ito clearly contains inorganic particles, which are excluded from Applicants' photoreactive compositions.

For at least these reasons, the combination of Fleming and Ito does not provide Applicants' claimed process. Applicants therefore respectfully request that the rejection under Section 103 be withdrawn.

Claims 28-35 were rejected under Section 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/ 0012872 (Fleming et al., hereinafter referred to as Fleming) in view of U.S. Patent Application Publication No. 2003/0151032 (Ito et al., hereinafter referred to as Ito) as applied to Claims 1-6, 8-16, 23-27, and 37-38, and further in view of U.S. Patent No. 4,406,992 (Kurtz et al., hereinafter referred to as Kurtz). This rejection is respectfully traversed for the following reasons.

This rejection was addressed in Applicants' last submitted Amendment, in remarks that are incorporated herein by reference. The Examiner has relied upon Kurtz for its description of silicon deposition and has asserted that the subject matter of Claims 28-35 is obvious in view of the combination of Fleming, Ito, and Kurtz.

As explained above, however, the combination of Fleming and Ito fails to provide Applicants' claimed process. The addition of Kurtz' silicon deposition does not overcome the deficiencies of Fleming and Ito, and thus the combination of Fleming, Ito, and Kurtz also does not provide Applicants' claimed process. Applicants therefore respectfully submit that their claimed process is indeed patentable over this combination of references and respectfully request withdrawal of the rejection under Section 103.

**Concluding Remarks**

Applicants have prosecuted this application in good faith and believe the claims to be in condition for allowance. Such action is respectfully requested.

Respectfully submitted,

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